



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,546	07/16/2003	Sivaramakrishna Kolachina	TI-34625 (1962-04800)	8435

23494 7590 09/07/2004

TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER

TANG, MINH NHUT

ART UNIT	PAPER NUMBER
----------	--------------

2829

DATE MAILED: 09/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/620,546

Applicant(s)

KOLACHINA ET AL.

Examiner

Minh N. Tang

Art Unit

2829

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 July 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,8-10 and 17-19 is/are rejected.
- 7) ☒ Claim(s) 2-7, 11-16 and 20-23 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. Figure 1 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.121(d)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

3. Claims 3-7, 10, 12-16, 21 and 23 are objected to because of the following informalities:

a/ in claims 3, 12 and 21, "wherein an event" (line 3), and "the appropriate channel" (lines 5-6) should be -- wherein the event count --, and -- an appropriate channel --, respectively. Furthermore, since the limitation "the height of each shaped pulse" (line 6) refers to "the height of the shaped pulse" recited in claims 2, 11 and 20, respectively; therefore, claims 3, 12 and 21 should respectively depend on claims 2, 11 and 20.

Art Unit: 2829

b/ in claims 4 and 13, a limitation followed by linking terms (e.g., can be) is considered indefinite since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. Therefore, "can be" should be -- is --.

c/ in claims 5 and 14, since there are two types of the sample (i.e., the integrated circuit sample and the reference sample); therefore, "the sample" (line 2) should be -- the integrated circuit sample --.

d/ in claims 6 and 15, "can be" (line 1), and "the reference curves" (line 2) should be -- is --, and -- the reference curve --, respectively.

e/ in claim 7 and 16, line 1, "can be" should be -- is --.

f/ in claim 10, "a semiconductor sample" (line 1), and "an integrated circuit sample" (line 3) should be -- an integrated circuit sample --, and -- the integrated circuit sample --, respectively.

g/ in claim 23, "can be" (line 1), and "the reference curves" (line 2) should be -- is --, and -- reference curves --, respectively.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 8-10, and 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimase et al. (U.S.P. 5,952,658).

As to claim 1, Shimase et al. disclose, in Fig. 1, a semiconductor milling endpoint detection system comprising: a focused ion beam (FIB) apparatus (100) for directing a focused ion beam (2) at an integrated circuit sample (9), wherein a charge pulse is generated each time an ion from the beam (2) strikes the sample (9); a plurality of charge pulse detection electronics (CPDE) components (7, 12, 30, 60, 80), wherein the CPDE components (7, 12, 30, 60, 80) are coupled to the sample (9); and a histogram display (91).

As to claims 8 and 17, Shimase et al. disclose in fig. 1, the CPDE components (7, 12, 30, 60, 80) comprise: a charge preamplifier (7), wherein the charge preamplifier (7) is directly coupled to a layer of interest within the sample (9), a pulse shaper (30) directly coupled to the charge preamplifier (7); a pulse amplifier (12) directly coupled to the pulse shaper (30); and a multi-channel analyzer (80) directly coupled to the pulse amplifier (12).

As to claims 9 and 18, Shimase et al. disclose in Fig. 1, the CPDE components (7, 12, 30, 60, 80) comprise: a charge preamplifier (7) is directly coupled to a layer of interest within the sample (9); a spectroscopy amplifier (12, 30, 60) directly coupled to the charge preamplifier (7); and a multi-channel analyzer (80) directly coupled to the spectroscopy amplifier (12, 30, 60).

As to claim 10, Shimase et al. disclose, in Fig. 1, a method for detecting a focused ion beam milling endpoint on an integrated circuit sample comprising: striking the integrated circuit sample (9) with an ion beam (2) generated by a focused ion beam (FIB) apparatus (100); utilizing a plurality of charge pulse detection electronics (CPDP)

Art Unit: 2829

components (7, 12, 30, 60, 80) to detect and configure a charge pulse generated each time an ion from the beam (2) strikes the sample (9); and creating a distribution curve on a histogram display (91) based on output of the CPDE components (7, 12, 30, 60, 80).

As to claim 19, Shimase et al. discloses, in Fig. 1, an integrated circuit sample milled according to a process comprising the steps of: striking the sample (9) with an ion beam (2) generated by a focused ion beam (FIB) apparatus (100); detecting and configuring a charge pulse (8) generated each time an ion from the beam (2) strikes the sample (9) with a plurality of charge pulse detection electronics (CPDE) components (7, 12, 30, 60, 80); and generating a distribution curve on a histogram display (91) based on output of the CPDE components (7, 12, 30, 60, 80).

Allowable Subject Matter

6. Claims 2-7, 11-16, and 20-23 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 2-7, 11-16, and 20-23 recite, inter alia, the CPDE components comprise: a charge preamplifier directly coupled to a layer of interest within the sample and configured to amplify and integrate the charge pulse to produce a voltage pulse indicative of the size of the charge pulse; a pulse amplifier directly coupled to the charge preamplifier and configured to amplify the voltage pulse; a pulse shaper directly coupled to the pulse amplifier and configured to optimize the shape of the voltage pulse to a height proportional to the charge pulse; and a multi-channel analyzer (MCA) directly

Art Unit: 2829

coupled to the pulse shaper and configured to detect the height of the shaped pulse and sort the shaped pulse into one of a plurality of channels, wherein each channel is associated with a range of shaped pulse heights.

The art of record does not disclose the above limitations, nor would it be obvious to modify the art of record so as to include the above limitations.

It is noted that claims 3-7, 12-16, 21 and 23 should be amended to overcome the objection set forth in this Office action.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

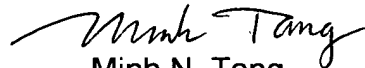
Orloff et al.	4,629,898	Electron And Ion Beam Apparatus And Passivation Milling.
Talbot et al.	5,140,164	IC Modification With Focused Ion Beam System.
Lindquist et al.	5,541,411	Image-To-Image Registration Focused Ion Beam System.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh N. Tang whose telephone number is (571) 272-1971. The examiner can normally be reached on M-F (7:00-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Tokar can be reached on (571) 272-1812. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2829

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Minh N. Tang
Primary Examiner
Art Unit 2829
9/01/04